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THOM, however, came to the author's hands only in time to be noted in the proof. A closer approximation to definitely known conditions, if not yielding positive results, might at least have resulted in excluding certain groups of factors as having no influence on the formation of coremia.

In the latter part of the paper, the author distinguishes 11 forms of *Penicillium* by their growth characters on the substrata which he used in the first part. The forms are not further characterized nor identified with other descriptions. The author lays stress on cultural characteristics, and the utilization of the coremia-forming habit for separating the species of *Penicillium*. Both have been used by THOM in his partial monograph of the group.—H. HASSELBRING.

Feed containing smut spores.—The feeding of grain products containing large quantities of smut spores to animals has usually been regarded as pernicious, both on account of the widespread belief, supposed to be based on practical experience, that the smut spores are injurious to animals, and on account of the danger that the spores pass uninjured through the animal body and, as asserted by BREFELD, become a source of infection when they are distributed over the fields in manure. These questions have been reinvestigated by HONCAMP and ZIMMERMANN,³⁵ who as a result of feeding experiments, in which large quantities of smut spores, mostly of *Tilletia caries* with some of *T. laevis*, were fed to different domestic animals for long periods of time, came to the conclusion that in no case could any injury be definitely attributed to the smut spores. The spores which had passed through the bodies of animals, with rare exception, were incapable of germination. Further experiments showed that sound spores mixed with manure or other fertilizers and scattered over the soil rarely cause infection of grain. These experiments indicate that the danger of infection from smut spores scattered over the fields in manure has been largely overestimated. This is true more particularly of the spores that have passed through the animal body. The only source of infection to be regarded of significance in agricultural practice is that from the spores adhering to the seed grain, a fact which may be inferred from the almost total prevention of smut by treatment of the seed grain.—H. HASSELBRING.

Temperate plants in Helgoland.—Since the spring of 1904, KUCKUCK has been experimenting with the introduction into Helgoland of various species of plants of warm temperate climates.³⁶ Although situated but 30

³⁵ HONCAMP, FR., und ZIMMERMANN, H. (unter Mitwirkung von G. SCHNEIDER), Untersuchungen über das Verhalten von Brandsporen im Tierkörper und im Stall-dünger. Centralbl. Bakt. II. 28:590-607. 1910.

³⁶ KUCKUCK, P., Ueber die Eingewohnung von Pflanzen wärmerer Zonen auf Helgoland. Bot. Zeit. 68:49-86. pls. 1-3. figs. 2. 1910.

km. from the mainland, this island enjoys many of the features of an insular climate. February, the coldest month, has a mean temperature of only $1^{\circ}34$ C., and the lowest temperatures of the winter seldom exceed -8° C. This is much milder than the climate of the mainland, but less genial than that of the southern coast of England. Notwithstanding the favorable temperatures, many plants are injured by the severe and incessant winter winds, and by the lack of a protective covering of snow. KUCKUCK describes his results in detail, indicating the successful culture in the open of a large number of species, including such plants as *Pittosporum Tobira*, *Camellia japonica*, two species of *Fuchsia*, and various opuntias. Perhaps the most noteworthy of them is the fig, *Ficus carica*, which has been cultivated on the island for thirty years, attains a height of 4.5 meters, and matures fruit regularly. KUCKUCK considers in general that the winds are more hostile to plant life than the frosts, and believes that other species might prove hardy if they could be given soils better suited to their requirements.—H. A. GLEASON.

Twining.—NIENBURG³⁷ has made a detailed study of the nutation movements of young twining plants in their early stages of circumnutation. He believes that all the circumnutation and twining movements can be explained by the joint action of autonomic nutation and negative geotropism. He also believes that he has entirely disposed of NOLL's conception of lateral geotropism. A careful analysis of his results, however, shows that lateral geotropism will also explain all movements he describes, with the possible exception of one on the centrifuge. The strongest evidence for NOLL's conception was gained from the use of the centrifuge, and now with a slight alteration of the position of the plant NIENBURG obtains results on this instrument that seem to disprove NOLL's conception. NIENBURG's centrifuge experiments have their main value, however, in showing the need of further centrifuge studies in this field.—WILLIAM CROCKER.

Amphibious polygonums.—A recent paper very plainly shows that extensive experimental cultures will be necessary before the taxonomic and ecological relationships of the various species of *Polygonum* can be settled. NIEUWLAND³⁸ distinguishes at least three closely related species of this interesting genus which exhibit both an aquatic and a terrestrial form, but adds no experimental data to our present scanty fund. The species described vary so much in response to varying conditions of habitat that it seems possible that all these forms, with intermediate gradations, might be produced from the same stock by careful methods of culture. An interesting historical résumé of the litera-

³⁷ NIENBURG, WILHELM, Die Nutationsbewegungen junger Windepflanzen. *Flora* **102**: 117-146. 1911.

³⁸ NIEUWLAND, J. A., Our amphibious Persicarias. *Amer. Midland Naturalist* **2**: 1-24. 1911.